NON-PUBLIC?: N
ACCESSION #: 8811170292
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Quad Cities Unit Two PAGE: 1 of 5

DOCKET NUMBER: 05000265

TITLE: Unit two Manual Scram Due to Improper Valving Sequencing while returning the Instrument Air System to Service in the Isolation of service Air to Instrument Air
EVENT DATE: 10/15/88 LER #: 88-026-00 REPORT DATE: 11/10/88

OPERATING MODE: 4 POWER LEVEL: 096

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: James Griffin, Technical Staff Engineer TELEPHONE: 309-654-2241 Ext 2147

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE TO NPRDS:

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

On October 15, 1988, Quad Cities Unit Two was operating in Economic Generating Control (EGC) with a range of 725 to 800 MWe. At 0040 hours, the Unit Two Instrument Air Compressor Dryer "B" Prefilter and the "A" Afterfilter were being returned to service, when the service air back-up to the instrument air system was inadvertently isolated. The scram air header pressure decreased to 44 psig. The reactor was manually scrammed at 0047 hours as directed by the Shift Engineer. NRC notification of this event was completed at 0144 hours to comply with the requirements of 10CFR50.72.

This event was caused by performing the RTS in the wrong sequence. Contributing factors are a misunderstanding of sequencing, lack of knowledge concerning instrument air, and the incorrect installation of a dryer blowdown valve.

Immediate corrective actions taken include tailgate sessions with each operating crew covering sequencing and the instrument air system as it relates to the

service air system, and the correct installation of the blowdown valve. Corrective actions include a new OOS training program for all operators as well as plant training for non-licensed operators on instrument air, revision of the instrument air lesson plans, training for the work analysts concerning reliability-related work, a revision to the OOS procedure (QAP 300-14), and a study by the Station's Instrument Air Task Force to evaluate the Station's current instrument air system design.

This report is provided to comply with the requirements of 10CFR50.73(a)(2)(iv).

END OF ABSTRACT

PLANT AND SYSTEM IDENTIFICATION:

General Electric - Boiling Water Reactor - 2511 MWt rated core thermal power.

EVENT IDENTIFICATION: Manual Scram Due to Improper Valving Sequence While Returning the Instrument Air System to Service Resulting in the Isolation of Service Air to Instrument Air.

A. CONDITIONS PRIOR TO EVENT:

Unit: Two Event Date: October 15, 1988 Event Time: 0047
Reactor Mode: 4 Mode Name: RUN Power Level: 96%

This report was initiated by Deviation Report D-4-2-88-054.

RUN Mode (4) - In this position the reactor system pressure is at or above 825 psig, and the reactor protection system is energized, with APRM protection and RBM interlocks in service (excluding the 15% high flux scram).

B. DESCRIPTION OF EVENT:

On October 15, 1988, Unit Two was operating in Economic Generating Control (EGC) with a range of 725 to 800 MWe. The Unit Two Instrument Air Compressor IA!CMP! and Air Dryer (DRY) were out-of-service (OOS) (2394-88). The work to be performed included preventive maintenance on the filters FLT! and air dryers, and corrective maintenance on the dryer blowdown valves VLV!. Instrument air was being supplied to Unit Two by the 112 Instrument Air Compressor and the Service Air (LF) backup to instrument air.

At the beginning of midnight shift on October 15, 1988, the Unit Two

Instrument Air Compressor and Filter (OOS 2394-88) were being prepared for a return-to-service (RTS). The SCRE reviewed the Master Out-of-Service Checklist, QAP 300-S5, and completed the "R/S POS" column on the sheet. The Shift Engineer then verified the correct positions were designated. Neither the SCRE nor the Shift Engineer consulted any drawings during their verification. Both the SCRE and Shift Engineer felt that the job was routine due to the fact that the compressor was already OOS and sufficient air pressure was available through the service air tie to the instrument air system. During this event neither individual recognized that the service air system tied in upstream of the Unit Two Instrument Air Dryer. The dryer bypass valve was OOS in the OPEN position to provide a flowpath for service air.

The Center Desk (CD) NSO assigned the extra Equipment Attendant (EA) the job to return the system to service. The CD NSO told the EA to do cards one through eleven, call the Control Room when he was done and to make a copy of OOS 2394-88. The EA read the Special Instructions and noted that there was nothing which addressed the RTS. When he began the job (approximately 0040 hours), he started with card 1, 2-4799-12, dryer bypass valve closed. This caused the service air backup to be isolated. As he opened the dryer inlet valve (card 2), he observed air flow out the dryer blowdown valves. He closed this valve and checked the system header pressure which read approximately 93 psig. Since the reading was normal, he continued with cards four through eleven. He finished with these cards and went back to the dryer inlet (card 2) and outlet (card 3) valves.

The Control Room received the low air header pressure alarm at 0042 hours and the CD NSO tried to contact the EA. He was unable to reach the EA, but he did tell an Equipment Operator (EO) to go to the area and assist. The SCRE also contacted the Shift Foremen and conveyed the situation to them. They proceeded to the instrument air compressor. The EO arrived first and told the EA of the problem. The EA showed the EO the RTS Checklist and called the Control Room. The CD NSO ordered the service air backup pressure control valve bypass LF! PCV! opened up. This was done; however, the dryer was still isolated with the bypass valve closed, so there was no flowpath available. The EA told the Shift Foremen as they arrived that the dryer blowdown valves were stuck open, but were isolated. They were reviewing the system line-up when the unit was manually scrammed (0047 hours). The operators thought about opening the dryer bypass valve, but it was thought that the compressor was still OOS and this wouldn't help.

The Control Room personnel reacted well to the degrading conditions while monitoring instrument air pressure. Following the low pressure alarms (0042 hours), the "A" feedwater regulating (reg) valve SJ!FCV! locked up at

about 30% open. The reactor building NH) to suppression chamber vacuum breakers (1601-20A&B) BF!VACB! opened. The normal feedwater heater level control valves (LCV) began to close and the emergency feedwater heater level control valves opened. These are expected responses to an event involving degradation of instrument air pressure. The heater trips required power to be lowered with recirculation flow AD! as required by QOA 3500-1. The CD NSO did this while the Unit NSO maintained reactor water level. The Shift Engineer closely monitored the scram air header pressure (AA), while the SCRE assisted the NSO's. The Shift Engineer ordered the operators to watch for control rod drift alarms and report if any rod was observed to drift. As the drift alarm annunciated, the drifted rod was selected and seen moving from position 47 to 46. Another control rod's scram light lit, and the Shift Engineer ordered the manual scram at 0047 hours. The reactor water level was controlled by isolating both feedwater regulating valves. The maximum water level swing was -7 inches to +65 inches before level was restored to normal. The amount of time elapsed during the event from the first alarm to scram was approximately five minutes.

C. APPARENT CAUSE OF EVENT:

This report is submitted in accordance with the code of Federal Regulations, 10CFR50.73(a)(2)(iv), which requires the reporting of any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature, including the Reactor Protection System.

The primary cause of this event is the failure to use the proper sequence during the RTS of the instrument air system. The failure to use the proper sequence resulted in an isolation of service air to the instrument air system. Had the RTS been done in the reverse sequential order to the OOS, then the isolation would not have occurred until after a flowpath had been established through the dryer. The failure to sequence properly can be attributed to a misunderstanding of how sequencing should be performed.

The misunderstanding that operations has concerning sequencing comes from a lack of OOS training in which sequencing is addressed. Also, the procedure in effect at the time of the event is difficult to understand concerning reverse sequencing and contains no precautions on what to do if problems develop during the OOS or RTS of equipment.

A contributing cause to the event was a failure to identify where the service air system ties into the instrument air system. The personnel involved in this event did not recognize that the service air is supplied to the instrument air system upstream of the filters and dryers. The lack of knowledge of where air ties into instrument air is the result of inadequate

lesson plans for this system.

The incorrect installation (improper orientation) of the dryer blowdown valve by Mechanical Maintenance also contributed to the event by allowing a significant loss of air pressure during the return-to-service. In addition, if the blowdown valves would have been in the proper orientation, a flow path for Service Air Backup would have been immediately re-established. This blowdown interrupted the return-to-service and the normal restoration of the air supply to the instrument air system. The valve was installed incorrectly due to insufficient work instructions.

D. SAFETY ANALYSIS OF EVENT:

Safety significance is considered minimal for this incident because of actions taken by the operating crew. The operating crew took action to mitigate the consequence of the loss of instrument air. Control rod positions were monitored, and a manual reactor scram was taken because of the random control rod movement as air pressure decreased. Instrument air pressure was restored shortly after the event.

E. CORRECTIVE ACTIONS:

A corrective action taken immediately after the event was the implementation of tailgate sessions with each operating crew as they came on shift. The OOS procedure regarding sequencing was discussed as well as how the Instrument Air System relates to the Service Air System. Also, the incorrectly installed dryer blowdown valve was corrected to operate properly by switching the air lines on the pilot solenoid.

The corrective actions taken to prevent a recurrence of this event can be broken up into three types of corrective actions; revision of the training. given to the operators and work analysts, revision of the OOS procedure used by operating, and an evaluation of the Instrument Air System by the Station's Instrument Air Task Force.

The OOS training for all operators will be updated to emphasize sequencing. The new revision of QAP 300-14, Revision 18, will also be included in this training (NTS 2652008805401). All non-licensed operators will receive in-plant training on the Loss of Instrument Air (QOA 4700-1) (NTS 2652008805402). The lesson plan for the Instrument Air System is being updated to better address system configuration and operational concerns. All operators will receive training on this updated lesson plan during retraining (NTS 2652008805403). The work analysts will receive training on reliability-related work and reliability-related work package preparation

(NTS 2652008805404).

The OOS procedure QAP 300-14 was revised on October 17, 1988, to make sequencing easier to understand. The OOS Checklist, QAP 300-S5, was also revised on that date to include columns now for OOS and RTS sequencing. The OOS procedure will be further revised to include what to do if something goes wrong during OOS and RTS (NTS 2652008805405).

The Station Instrument Air Task Force has been given the job of addressing the Station Modification Review Committee (SMRC) concerning the capability and consistency of various instrument air components. The System Engineer for instrument air will track the progress of the Instrument Air Task Force (NTS 2652008805406).

F. PREVIOUS EVENTS:

Licensee Event Report Description

265/88-020 Unit Two Emergency Core Cooling
System Initiation Signal Received
During Improper Valving Sequence on
Reactor Water Level
Instrumentation

G. COMPONENT FAILURE DATA:

There was no component failure identified in this event.

ATTACHMENT # 1 TO ANO # 8811170929 PAGE 1 OF 1

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RLB-88-371

November 14, 1988

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Reference: Quad-Cities Nuclear Power Station
Docket Number 50-265, DPR-30, Unit Two

Enclosed is Licensee Event Report (LER) 88-026, Revision 00, for Quad-Cities Nuclear Power Station.

This report is submitted in accordance with the requirements of the Code of Federal Regulations, Title 10, Part 50.73(a)(2)(iv): The licensee shall report any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS).

Respectfully,

COMMONWEALTH EDISON COMPANY
QUAD-CITIES NUCLEAR POWER STATION

R. L. Bax
Station Manager

RLB/AAF/ad

Enclosure

cc: I. Johnson
R. Higgins
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NRC Region III

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